ASSIGNMENT 3

Textbook Assignment: “Steam Catapults”; chapter 4, pages 4-1 through 4-76.

3-1. What are the most significant differences among the various types of steam catapults?

1. Power strokes and lengths
2. Endspeeds and power strokes
3. Endspeeds and launching capacities
4. Lengths and launching capacities

IN ANSWERING QUESTIONS 3-2 THROUGH 3-4, SELECT FROM COLUMN B THE SYSTEM THAT CONTAINS THE COMPONENTS LISTED IN COLUMN A.

	A. COMPONENTS	B. SYSTEMS
3-2.	Launching valve assemblies	1. Steam system
3-3.	Injector nozzles	2. Launching system
3-4.	Digital endspeed indicator magnetic sensors	3. Drive system
		4. Lubrication system

3-5. What determines the number of launching cylinders that are mounted in the catapult trough?

1. Type and overall length of the catapult
2. Required amount of elongation for the type of catapult
3. Number of base pads in the trough
4. Number of lubricator nozzles required for the type of catapult

3-6. What function is provided by the cylinder covers of the launching engine?

1. Eliminates the need for external bracing of the trough covers and track assembly
2. Prevents steam from escaping through the cylinder slots during the power stroke
3. Prevents steam pressure from spreading the cylinder in the area of the cylinder slot
4. provides a means of connecting the shuttle to the piston assemblies

3-7. What prevents the loss of steam from behind the steam piston assemblies during the catapult’s power stroke?

1. Sealing strips
2. Piston rings
3. The piston barrel
4. Bushings

3-8. What force maintains the tension on the catapult launching engine cylinder sealing strip?

1. Hydraulic pressure
2. Spring tension
3. Steam pressure
4. Air pressure

3-9. What component serves as the chassis for the other components of the steam piston assembly?

1. The spear
2. The barrel
3. The connector
4. The support guide

3-10. What component serves as a bearing surface for the piston assembly?

1. The rubbing strip
2. The barrel
3. The piston guide
4. The strip guide

3-11. A total of how many rollers are mounted on the shuttle frame?

1. Six
2. Two
3. Eight
4. Four

3-12. What component of the water brake cylinder installation forms the vortex at the open end of the water brake cylinder?

1. The jet ring
2. The striker ring
3. The annulus ring
4. The choke ring

3-13. The term “elbow pressure” refers to what specific pressure?

1. The basket strainer inlet pressure
2. The basket strainer outlet pressure
3. The water pressure entering the water brake cylinder
4. The pump discharge pressure

3-14. Which of the following information is NOT displayed on the Digital Endspeed Indicator (DESI)?

1. Time of day
2. CSV setting
3. Shuttle endspeed
4. Catapult number

3-15. All catapult trough covers are designed to withstand what total amount of vertical rolling shuttle load?

1. 100,000 lb
2. 132,000 lb
3. 200,000 lb
4. 264,000 lb

3-16. What switch or valve controls the flow of steam from the ship's boilers to the catapult's dry-steam receivers or wet-steam accumulator?

1. The steam launching valves
2. The capacity selector valve
3. The steam fill valves
4. The steam pressure cutoff switch

3-17. How far must the rotary launch valve control assembly crosshead travel to stop the number 2 launch valve stroke timer clock?

1. 3 1/2 in.
2. 6 in.
3. 9 in.
4. 11 1/2 in.

3-18. What device controls the opening rate of the launch valves to allow the launching of various types and weights of aircraft?

1. The launch valve control valve
2. The capacity selector valve
3. The launch valve stroke timers
4. The steam pressure cutoff switch

3-19. What mechanism prevents a steam buildup behind the launching engine steam pistons until the catapult is fired?

1. The exhaust valve
2. The pressure-breaking orifice elbow
3. The exhaust valve keeper valve
4. The wet-steam accumulator

3-20. What force causes the launch pilot latch solenoid to shift when the catapult FIRE circuit is energized?

1. Air pressure
2. Hydraulic pressure
3. Mechanical force
4. Electrical energy

3-21. The exhaust valve hydraulic lock valve controls the flow of fluid to which of the following components?

1. The steam pressure cutoff switch
2. The pressure breaking elbow
3. The exhaust valve limit switch
4. The exhaust valve hydraulic actuator

3-22. The contacts of the steam cutoff pressure switches close when the steam pressure in the launching engine cylinders reaches what pressure?

1. 10 psi
2. 20 psi
3. 30 psi
4. 40 psi

3-23. What is the function of both the linear and rotary retraction engines?

1. To control the movement of the grab only
2. To retract the launching engine steam pistons only
3. To maneuver the shuttle forward and aft only
4. To maneuver the shuttle forward and aft when slow movement is required by controlling the movement of the grab

3-24. The retraction engine drive system cables are attached to what component(s)?

1. The shuttle only
2. The grab only
3. The shuttle and launching engine steam pistons
4. The grab and launching engine steam pistons

3-25. During normal launching operations, when will the grab release the shuttle?

1. When endspeed has been reached and the unlocking mechanism is disengaged
2. When launch complete is reached and the locking mechanism is actuated
3. When both have returned to battery position and the unlocking mechanism is actuated
4. When maximum load drag weight is reached and the unlocking mechanism automatically disengages

3-26. The fixed sheave assembly, in conjunction with what other component, converts the longitudinal motion of the linear retraction engine into the motion of the cables to operate the grab?

1. The retraction engine control valve
2. The retract stroke buffer
3. The accumulator
4. The crosshead assembly

3-27. What drive system component(s) provide(s) a means of adjusting the battery position of the grab on the linear retraction engine?

1. Crosshead
2. Cable tensioners
3. Cable equalizers
4. Adjustable idler sheaves

3-28. What component stops the forward motion of the linear retraction engine crosshead?

1. The retraction engine control valve
2. The retract buffer
3. The advance buffer
4. The maneuver forward valve

3-29. The advance and retract cycle times of the linear retraction engine are determined by which of the following components?

1. The metering rods
2. The fixed orifices
3. The fine adjustment valves
4. The retraction engine control valve

3-30. Which of the following components direct(s) the flow of fluid from the retraction engine hydraulic accumulator to the operating chambers of the linear retraction engine main hydraulic cylinder?

1. The retraction engine control valve
2. The engine hydraulic blocking valve
3. Two air-operated solenoid valves
4. Three main hydraulic pumps

3-31. Which of the following conditions would indicate a water loss in the catapult hydraulic fluid?

1. An increase in ph number
2. A decrease in ph number
3. An increase in viscosity
4. A decrease in viscosity

3-32. What is the function of the catapult main hydraulic pump delivery control unit?

1. To direct fluid to the gravity tank when the pump is on stroke only
2. To direct fluid to the accumulator when the pump is off stroke only
3. To direct fluid to the accumulator when the pump is on stroke and to the gravity tank when the pump is off stroke
4. To direct fluid to the accumulator when the pump is off stroke and to the gravity tank when the pump is on stroke

3-33. The motion of the rotary retraction engine hydraulic motor is transferred to the cable drive system by what assembly?

1. The traverse carriage assembly
2. The crosshead assembly
3. The sheave and adapter assembly
4. The drum assembly

3-34. The forward motion of the rotary retraction engine is stopped at the completion of the grab advance cycle by what force or device?

1. By cable dead weight drag
2. By fluid acting on the carriage assembly
3. By the advance buffer
4. By fluid braking of the hydraulic motor

IN ANSWERING QUESTIONS 3-35 THROUGH 3-38, SELECT THE COMPONENT FROM COLUMN B THAT MATCHES THE PURPOSE OF THE ROTARY RETRACTION ENGINE COMPONENT LISTED IN COLUMN A.

	A. PURPOSES	B. COMPONENTS
3-35.	Guides the cables between the engine and the grab	1. Cable tensioner assembly
3-36.	Prevents the cables from becoming crossed and tangled on the drum	2. Screw and traverse carriage assembly
3-37.	Operates hydraulically to keep the retraction engine cables tight	3. Lead sheave assembly
3-38.	Provides a means of transmitting the force developed by the tensioner to the cable	4. Cable tensioner sheave assembly

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3-39. What is the function of the rotary retraction engine maneuvering valve?

1. To protect the engine from damage in the event of a malfunction
2. To control the bridle tensioner control valve
3. To control the speed of the grab after advance or retract stroke braking has been completed
4. To initiate the advance and retract stroke braking

3-40. The bridle tensioner fully aft limit switch is part of two catapult electrical circuits. One is the retract permissive circuit. What is the other one?

1. The maneuver forward
2. The maneuver aft
3. The military power
4. The suspend circuit

3-41. The C-7 and C-11 catapult control systems differ from the C-13 control system in which of the following ways?

1. They have various circuit breakers, fuses, and panel lights
2. They have control units that utilize only solenoids and relays
3. They have control consoles located below the flight deck
4. They have cam operated pilot valves used in conjunction with the electrical components

3-42. A total of how many positions are indicated on the C-7/C-11 catapult control console sequence indicator dial?

1. Five
2. Six
3. Seven
4. Eight

IN ANSWERING QUESTIONS 3-43 THROUGH 3-45, SELECT FROM COLUMN B THE COMPONENT OF THE CAM CONTROL UNIT THAT PERFORMS THE FUNCTION LISTED IN COLUMN A.

	A. FUNCTIONS	B. COMPONENTS
3-43.	Drives the main-drive indicator on the sequence indicator dial	1. DC shaft
3-44.	Controls the camshafts and the cam control unit	2. DK shaft
3-45.	Actuates the launch valve pilot valve	3. Fire solenoid
		4. Handcrank

3-46. Which of the following controls is NOT a momentary contact push button?

1. Fire
2. Maneuver aft
3. Lube
4. Maneuver forward

IN ANSWERING QUESTIONS 3-47 THROUGH 3-49, SELECT FROM COLUMN B THE PANEL THAT INDICATES THE FUNCTION LISTED IN COLUMN A.

	A. FUNCTIONS	B. PANELS
3-47.	Indicates pressures and temperatures of various components	1. Emergency panel
3-48.	Used to control normal launching operations	2. Gauge panel
3-49.	Contains all lights, switches, and push buttons that are found on the deckedge panel	3. Operating panel

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3-50. What panel indicates the catapult readiness to the catapult launching officer during normal operations?

1. The gauge panel
2. The monitor panel
3. The auxiliary deckedge panel
4. The operating panel

3-51. The PRI-FLY control panel indicates to the air officer the condition of readiness of which of the following equipment?

1. Aircraft
2. Recovery equipment
3. Catapults
4. LSO platform

3-52. The controls for the integrated catapult control system (ICCS) are mainly divided between or among how many control stations?

1. Five
2. Two
3. Three
4. Four

3-53. The malfunction and status lights are located on what panel or console of the ICCS?

1. The central panel
2. The cat officer control console
3. The emergency deckedge control console
4. The monitor panel

3-54. The emergency deckedge control panel of the ICCS is operational during which of the following situations?

1. Normal operations only
2. Emergency mode II only
3. Emergency mode I only
4. At all times

THE CENTRAL CHARGING PANEL IS DIVIDED INTO FOUR MAIN PANELS, IN ANSWERING QUESTIONS 3-55 THROUGH 3-57, SELECT THE PANEL FROM COLUMN B THAT MATCHES THE FUNCTION PERFORMED IN COLUMN A.

	A. FUNCTIONS	B. PANELS
3-55.	Controls and monitors the pneumatic system	1. Left front panel
3-56.	Controls and monitors the hydraulic system	2. Left intermediate front panel
3-57.	Monitors the various functions of the catapult during normal operations	3. Right front panel

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3-58. The exhaust valve closes in what phase of catapult operation?

1. Final ready
2. Standby
3. First ready
4. Launch complete

3-59. The low pressure air supply is shut off to what control valve during the firing of no-loads?

1. The bridle tension valve
2. The maneuver aft valve
3. The lubrication valve
4. The advance valve

3-60. In addition to the grab being fully advanced, what other condition(s) must exist before the retract permissive light will come on at deckedge?

1. The exhaust valve must be open
2. The deck (bridle) tensioner must be in
3. The retract buffer must be out
4. All of the above

3-61. Under normal launching conditions, what should be the last word(s) spoken over the sound powered phones?

1. FIRST READY
2. TAKING TENSION
3. FINAL READY
4. FIRE

3-62. What signal is used by the deckedge operator to indicate that the FINAL READY light has come on at the deckedge panel and the catapult is in the FINAL READY condition?

1. Both hands are held open and above the head
2. One hand is held open and above the head
3. One hand is held above the head with two fingers extended
4. Both hands are held above the head with only the index fingers extended

3-63. Which of the following actions must the deckedge operator take after receiving the FIRE signal from the catapult officer?

1. Immediately push the FIRE push button
2. Hesitate for at least 10 seconds to ensure that the aircraft is at full power, then push the FIRE push button
3. Notify the console operator that he is firing the catapult, then push the FIRE push button
4. Perform a final safety scan of the flight deck and catwalks, then push the FIRE push button

3-64. What immediate action must be taken by the deckedge operator if the catapult officer signals a hangfire?

1. Push the MANEUVER AFT push button to release bridle tension
2. Tell the console operator to actuate the SUSPEND switch
3. Close the EMERGENCY cutout valve and then actuate the SUSPEND switch
4. Actuate the SUSPEND switch and tell the console operator to CLOSE THE EMERGENCY CUTOUT VALVE, CLOSE THE EMERGENCY CUTOUT VALVE

3-65. An increase of 10 psi or more above the normal water-brake cylinder inlet elbow pressure would indicate which of the following conditions?

1. A cracked choke ring
2. A clogged annulus ring
3. A loose cylinder vane
4. A damaged striker ring

3-66. What component(s) of the water brakes could be damaged if the temperature of the water in the water brake tank is permitted to remain above 180°F during catapult operations?

1. The inlet elbow pressure sensing switches
2. The steam cutoff pressure switch
3. The water brake pump inlet strainer
4. The water brake pump bearings

QUESTIONS 67 THROUGH 70 APPLY TO THE LAUNCHING PROCEDURES USED WITH THE ICCS .

3-67. On ships where the ICCS is the primary mode of controlling catapult launching operations, who depresses the FIRE push button to launch an aircraft?

1. The launching officer
2. The deckedge operator
3. The catapult safety observer
4. The central charging panel operator

IN ANSWERING QUESTIONS 68 THROUGH 70, SELECT FROM COLUMN B THE PERSONNEL WHOSE RESPONSIBILITIES ARE LISTED IN COLUMN A.

	A. RESPONSIBILITIES	B. PERSONNEL
3-68.	Gives the tension signal to the catapult director	1. Hookup petty officer only
3-69.	Signals the launching officer to take tension	2. Catapult safety observer only
3-70.	Signals suspend to the launching officer	3. Catapult director only
		4. Hookup petty officer, catapult safety observer, or catapult director

3-71. Of the following conditions, which one would be a reason to suspend the catapult at the water brakes during catapult operations?

1. The cylinder elbow pressure is 45 psi
2. Only one pump is operating
3. The cylinder elbow pressure is 63 psi
4. Oil is flowing out of the overflow drain

3-72. Of the following conditions, which one would NOT require replacement of the retraction engine advance and retract cables?

1. More than five broken wires in one rope lay
2. More than 20 broken wires in any 30-foot length
3. The grab is out of ideal position
4. The cables have been in service for 24 months

3-73. A catapult daily work/maintenance logbook should be kept for how long after it has been filled with entries?

1. 1 yr
2. 2 yr
3. 3 yr
4. 5 yr